

REMARKS

Applicants respectfully request reconsideration and allowance of amended claims 1-6

Section 102 Rejection

The Examiner has rejected claims 1-6 under 35 USC 102(b) in light of US 4,951,852 to Rancoule. Anticipation exists where each and every material element of a claim is found in a single reference. Claim 1, the only remaining independent claim, teaches a refractory body covered at least in part by an insulating coating and the insulating coating covered at least in part by a glaze coating. Rancoule does not teach a glaze coating over an insulating coating and, consequently, cannot anticipate the present application.

Rancoule describes an insulating coating for use on a refractory body that has preferably been glazed with an anti-oxidant coating. The description and examples clearly teach first glazing a refractory article and subsequently applying the insulating coating over the glaze. See, e.g., column 2, lines 24-28 ("The refractory body is preferably glazed . . . prior to dipping to obtain an insulative coating."); column 3, lines 64-68 (glazing the tube before applying the insulating coating); column 4, lines 41-45 (glazing all twenty-four test tubes before applying the insulating coating); claim 5 (claiming a glaze surface interfacing between the refractory body and the insulating coating). These examples contradict the teaching of the present application that requires the glaze over the insulating coating. Rancoule does not teach glazing over the insulating coating and, therefore, does not teach a critical limitation of the present application. Rancoule does not anticipate claim 1 of the present application or its dependent claims.

Section 103 Rejection – Rancoule and Benson

The Examiner has rejected claims 1-4 and 6 as obvious in light of Rancoule and US 5,370,370 to Benson. Both patents are owned by the assignee of the present application and are well known to Applicants. Neither patent renders the present application obvious.

A prima facie case of obviousness exists only when the prior art, alone or in combination, teaches each element of a claim and fairly suggests the combination of such elements to one skilled in the art. Claim 1 is the sole independent claim. The remaining claims stand or fall with claim 1.

Applicants have discovered that the sequence of coatings described in Rancoule and Benson can produce substantial peeling of the insulating coating from a refractory body, particularly on the wide, flat portions of a thin slab nozzle. See, US 5,785,880 to Heaslip for a description of a thin slab nozzle. Neither Rancoule nor Benson teach or suggest the problem or solution disclosed in the present application. A rejection for obviousness is improper where the prior art neither identifies the problem nor suggests a solution.

As explained in the previous section, Rancoule applies an insulating coating over a glaze, and does not teach glazing over an insulating coating. The latter combination substantially avoids problems with peeling of the insulating coating from a refractory article. The prior art does not teach or suggest glazing over an insulative coating. While the present application and the prior art share elements, the invention, taken as a whole, is not obvious in light of the cited prior art.

Benson and Rancoule are just two examples where a refractory manufacturer has applied an anti-oxidation glaze over a graphite-containing pouring tube. Graphite increases thermal shock-resistance of the tubes, but is prone to oxidation. The glaze blocks the diffusion of oxygen to the tubes, thereby inhibiting oxidation of the graphite. Rancoule and Benson both apply an anti-oxidation glaze directly on a pour tube. Only after glazing, does Rancoule apply an insulating coating. Neither describes a benefit of or reason for coating the insulating coating with the anti-oxidation glaze.

In fact, the insulating coatings of Rancoule and the present invention already contain a large majority of oxides. An anti-oxidation glaze over the insulating coating would apparently make little sense. Logically, one skilled in the art would glaze the graphite-containing pour tube because that is the article prone to oxidation. Glazing over the insulating coating would simply waste glazing material and would place the anti-oxidation barrier further from the oxidation-prone article.

Rancoule and Benson do not teach the specific combination of elements found in the present application. Nor do they describe the problem addressed by the present application or suggest any solution to the problem. Applicants submit that the claims or the present application are not obvious in light of Rancoule and Benson.

Section 103(a) Rejection – Rancoule, Dody and Gough

The Examiner has rejected claim 5 as obvious in light of Rancoule and US 5,602,063 to Dody and US 5,632,326 to Gough. Claim 5 describes a composition of a suitable insulating coating, and depends from claim 1. Claim 1 is allowable over the prior art, so claim 5 is also allowable.

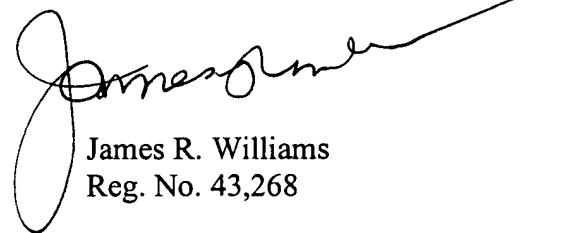
The insulating coating composition described in claim 5 is the subject of a related US application, US Patent Application No. 10/129993 filed 13 May 2002. The '993 application claims priority from PCT/EP00/13286 filed 16 November 2000. The '993 application and the present application were, at the time the invention was made, owned by the same entity or subject to an obligation of assignment to the same entity.

In light of the above, Applicants respectfully submit that claims 1-6 are patentable over the prior art. Early and favorable action is earnestly solicited.

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Respectfully submitted,



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1. A refractory article for use in the casting of molten metal comprising a refractory piece having a first outer surface, an insulating coating having a second outer surface and covering at least a portion of the first outer surface, and a glaze covering at least a portion of the second outer surface.
2. The refractory article of claim 1, wherein the refractory piece comprises a carbon-bonded refractory composition.
3. The refractory article of claim 1, wherein the refractory piece comprises a nozzle.
4. The refractory article of claim 3, wherein the nozzle comprises a thin-slab nozzle.
5. The refractory article of claim 1, wherein the insulating coating is made from an aqueous suspension comprising 20-80 wt.% ceramic matrix, 5-40 wt.% insulating microspheres, 0.5-15 wt.% one or more binders, 5-20 wt.% of a metal capable of melting under preheat conditions, and up to 25 wt.% water.
6. The refractory article of claim 1, wherein the glaze comprises a composition resistant to oxygen diffusion.
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